UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United-States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/764,155	01/22/2004	Leonard Wai Fung Kho	07303.0102	8141

22852 7590 01/29/2008

FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER LLP
901 NEW YORK AVENUE, NW
WASHINGTON, DC 20001-4413

EXAMINER	
PATEL, DHARTI HARIDAS	

ART UNIT	PAPER NUMBER
2836	

MAIL DATE	DELIVERY MODE
01/29/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/764,155	KHO ET AL.	
	Examiner	Art Unit	
	Dharti H. Patel	2836	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 November 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *9-43* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *9-43* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 November 2007* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *11/13/2007*.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

Specification

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: Applicant's specification lacks a description of a controller coupled to the actuator, wherein the controller controls the actuator to change gap distances between the target member and the first and second attracting members during an intermission of generating the attracting force as recited in claim 24.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Newly added claims 24 and 33 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 24 lines 10-12 recites: "a controller coupled to the actuator, wherein the controller controls the actuator to change gap distances between the target member and the first and second attracting members during an intermission of generating the attracting force. " and claim 33 lines 1-2 recites: "the controller changes the gap distance during an intermission of generating the attracting force." There does not appear to be any support for this in the applicant's disclosure. Furthermore, applicant has failed to point out where the support can be found for this

limitation. The support of any amendments made should also be specifically pointed out. See MPEP 2163.06. Appropriate correction is required.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 24 and 33 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The last 3 lines of claim 24 are contradictory. Claim 24, lines 10-11 and claim 32 lines 10-12 says that the controller controls the actuators to change gap distances; while line 12 of claim 24 and lines 1-2 of claim 33 says that this change occurs during a break or pause in the attracting force. It does not appear to be possible to change gap distances without generating some sort of attracting force. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 9-43 are rejected under 35 U.S.C. 102(b) as being anticipated by Yuan et al., Patent No. 6,130,517.

With respect to claim 9, Yuan discloses a method [Fig. 1; the device encompasses the method] of moving a fine stage device, the method comprising connecting a fine stage [Fig. 1, 120] device to a coarse stage device [Fig. 1, 110], the coarse stage device

comprising an attracting framework comprising opposing attracting members [Fig. 1, 123 and 124] and at least one target member [Fig. 1, object on top of fine stage 120; col. 3 lines 7-9], wherein the target member is located in a gap between the attracting members and connected to the fine stage device [Fig. 1; the object is mounted and therefore connected to the fine stage 120; col. 3 lines 7-9]; and manipulating the relative position of the target member by moving the attracting framework relative to a base member [Fig. 1, 112] to decrease the distance between one of the attracting members and the target member during a coarse stage adjustment phase [Fig. 1; this occurs when target 120 moves to the right towards attracting member 124 whilst stage 110 simultaneously moves to the left on base 112, as a result of target 120 being mounted on stage 110, both of which are mounted on base 112]. [See Response to Arguments below].

With respect to claim 10, Yuan discloses that at least one of attracting members comprises a core member and a coil assembly that is disposed near the core member, and the method further comprises providing a current to the coil assembly to cause acceleration movement of the fine stage device [Abstract, lines 9-15].

With respect to claim 11, Yuan discloses that at least one of the attracting members [Fig. 1, 123, and 124] comprises a core member and a coil assembly that is disposed near the core member, and the method further comprises providing a current to the coil assembly to cause deceleration movement of the fine stage device [the target will necessarily go through a period of deceleration as the controller signals it to go from a moving position to a fully stopped position].

With respect to claim 12, Yuan discloses a dual-force-mode fine stage apparatus [Fig. 1] comprising a first assembly including a target member [Fig. 1; an objected placed on the fine stage 120; col. 3 lines 7-9]; a second assembly including a first attracting member [Fig. 1, 123] and a second attracting member [Fig. 1, 124] located on opposite sides of the target member; and an actuator [col. 9 lines 3-6] associated with the second assembly, wherein the actuator moves the second assembly to adjust a relative distance between the target member and the first attracting member; wherein, before an acceleration phase, the actuator [Fig. 9; the coarse stage control system 310 combined with attracting members 123 and 124] adjusts a gap size between the target member [Fig. 2, 120] and an attracting member [Fig. 2, 123, 124] that provides acceleration during the accelerating phase [the target will necessarily go through a period of acceleration as the controller signals it to move from a stop position to a moving position] by moving at least one of the first attracting member [Fig. 2, 123] and the second attracting member [Fig. 2, 124] relative to a base member [Fig. 1, 112][Fig. 1; this occurs when target 120 moves to the right towards attracting member 124 whilst stage 110 simultaneously moves to the left on base 112, as a result of target 120 being mounted on stage 110, both of which are mounted on base 112], and during a constant velocity phase [col. 3 lines 54-58], the actuator changes a gap size between the target member and an attracting member that provides decelerating during a declaration phase [the target will necessarily go through a period of deceleration as the controller signals it to go from a moving position to a fully stopped position] my moving at least one of the first attracting member and the second attracting member relative to the base member [Fig. 1; this occurs when target 120 moves

to the right towards attracting member 124 whilst stage 110 simultaneously moves to the left on base 112, as a result of target 120 being mounted on stage 110, both of which are mounted on base 112]. [See Response to Arguments below].

With respect to claim 13, Yuan discloses a dual-force-mode stage assembly comprising a fine stage assembly [Fig. 1, 120]; a coarse stage assembly [Fig. 1, 110], the coarse stage assembly comprising opposing attracting members [Fig. 1, 123 and 124], each capable of drawing an electric current, with a gap between the attracting member elements; and a target member [Fig. 1, object shown on top of 120] in the gap, the target member being connected to the fine stage assembly [Fig. 1; the target member is on top of 120; col. 3 lines 7-9], wherein the coarse stage assembly is moveable along an axis independently of the fine stage assembly through a coarse actuator [Fig. 1; the coarse stage assembly moves in 8 y-axis direction whilst the fine stage assembly can move in any direction [Fig. 1, x, y, z, theta]; a sensor [col. 9 lines 10-11] configured to detect a position of the target member so that the relative distance between the target member and the attracting members can be determined; and a controller coupled to the coarse actuator [Fig. 9; the coarse stage control system 310 combined with attracting members 123 and 124] of the coarse stage assembly [Fig. 1, 110] to control the position of the attracting members [col. 9 lines 12-18, lines 21-23]; wherein the controller is adapted to change gap size between the target member [Fig. 1, 120] and one or more attracting members [Fig 1, 123, 124] that provide an acceleration force and/or a deceleration force to the target member during an acceleration and/or declaration phase [the target will necessarily go through a period of acceleration as the controller signals it to go from a fully stopped

position to moving position; and the target will necessarily go through a period of deceleration as the controller signals it to go from a moving position to a fully stopped position] by moving the coarse stage assembly relative to the fine stage assembly during a constant velocity phase followed by the acceleration and/or declaration phase. [See Response to Arguments below]

With respect to claim 14, Yuan discloses a table [Fig. 1, 120] that retains an object [col. 3 lines 7-9]. The rest of the claim limitations are in rejection of claim 13.

With respect to claim 15, Yuan discloses an exposure apparatus [col. 3 lines 7-9] comprising an illumination system that irradiates radiant energy; and a stage device [Fig. 2, 120] that carries an object [col. 3 lines 7-9] disposed on a path of the radiant energy. The rest of the claim limitations are in rejection of claim 13.

With respect to claim 16, Yuan discloses that the object comprises a wafer [col. 3 lines 7-9] or a reticle.

With respect to claim 17, Yuan discloses a method of operating an exposure apparatus [col. 3 lines 7-9], the method comprising employing a stage device [Fig. 1, 120] to position an object, wherein the stage device comprises a table that retains the object [Fig. 1, object is on top of fine stage 120; col. 3 lines 7-9]. The rest of the claim limitations are in rejection of claim 13.

With respect to claim 18, Yuan discloses that the object comprises a wafer [col. 3 lines 7-9] or a reticle.

With respect to claim 19, Yuan discloses a method of making a mico-device, the method comprising a photolithography process using a stage device to position an object,

wherein the stage deice comprises a table that retains the object [col. 3 lines 7-9]. The rest of the claim limitations are in rejection of claim 13.

With respect to claim 20, Yuan discloses that the object comprises a wafer [col. 3 lines 7-9] or a reticle.

With respect to claim 21, Yuan discloses a method of making a semiconductor device on a wafer, the method comprising operating an exposure apparatus via a stage device to position an object [col. 3 lines 4-11]. The rest of the claim limitations are in claim 13.

With respect to claim 22, Yuan discloses that the object comprises a wafer [col. 3 lines 7-9] or a reticle.

With respect to claim 23, Yuan discloses that the table comprises a wafer stage [Fig. 1, the fine stage 120 is the wafer stage] or a reticle stage.

With respect to claims 24-25 and 32-33, Yuan discloses an apparatus comprising: an attracting assembly [Fig. 1; actuators 121-126] including a first attracting member and a second attracting member opposing to the first attracting member, each of the attracting members generating attracting force; a target assembly [Fig. 1; 110] including a target member [Fig. 1, object on top of fine stage 120; col. 3 lines 7-9] situated between the first attracting member and the second attracting member; an actuator [Fig. 9; the coarse stage control system 310 combined with actuators 121-126] provided between the attracting assembly and the target assembly to change a relative position between the attracting assembly and the target assembly; and a controller coupled to the actuator, wherein the controller controls the actuator to change gap distances between the target member and

the first and second attracting members during an intermission of generating the attracting force [col. 3 lines 15-22 state that 6 degrees of freedom can be obtained by movement in the X, Y, and Z directions. Coarse stage adjustment is accomplished to maintain 400 um as stated in col. 8 lines 40-42, the target member 120 can be adjusted in the Z direction- i.e. there is a pause in the attracting force in the X or Y direction, and the controller now changes gap distances associated with the Z direction].

With respect to claims 26 and 34, Yuan discloses that the controller [Fig. 9; coarse stage control system 310] controls the actuator [Fig. 1; actuators 121-126] to position the target member [Fig. 1; the object mounted on the fine stage 120; col. 3 lines 7-9] nearer to one of the first and the second attracting members that generates a bigger attracting force than the other one [col. 4 lines 17-24].

With respect to claims 27 and 35, Yuan comprises a sensor [Fig. 1 and 9; position sensor Int1] connected to the controller [Fig. 9; coarse stage control system 310], wherein the sensor detects at least one of the gap distances between the target member and the first and second attracting members [col. 3 lines 29-45], and wherein the controller controls the actuator based on a signal including information of the gap distance from the sensor [Fig. 8; col. 8 lines 27-45].

With respect to claims 28 and 36, Yuan discloses that the first and second attracting members [Fig. 1; actuators 121-126] comprise a core member [col. 9 lines 49-50] and a coil wound around at least a portion of the core member, and the target member comprises a magnetic material [col. 3 lines 5-11].

With respect to claims 29 and 37, Yuan discloses that the actuator comprises a voice coil motor [col. 3 lines 24-27].

With respect to claims 30 and 38, Yuan comprises a fine stage [Fig. 1; 120] that holds an object [col. 3 lines 7-9] to be positioned, wherein the fine stage [Fig. 1; 120] is connected to the target assembly [Fig. 1; col. 3 lines 7-9; the target object is mounted, and therefore connected to the fine stage 120]; and a coarse stage [Fig. 1; coarse stage 110] moving with the fine stage [Fig. 1; 120], wherein the coarse stage is connected to the attracting assembly [Fig. 1; coarse stage 110 is connected to the attracting assembly of actuators 121-126].

With respect to claims 31 and 39, Yuan discloses that the fine stage [Fig. 1; 120] is accelerated [col. 1 lines 50-55] when the attracting force is generated by at least one of the attracting members [Fig. 1; actuators 121-126], and moves at a constant velocity [col. 3 lines 54-58] during the intermission of generating the attracting force [col. 3 lines 15-22 state that 6 degrees of freedom can be obtained by movement in the X, Y, and Z directions. Coarse stage adjustment is accomplished to maintain 400 um as stated in col. 8 lines 40-42, the target member 120 can be adjusted in the Z direction- i.e. there is a pause in the attracting force in the X or Y direction, and the controller now changes gap distances associated with the Z direction].

With respect to claim 40, Yuan discloses a method [Fig. 1; the device encompasses the method] of moving a fine stage [Fig. 1; 120] coupled to a coarse stage [Fig. 1; 110] by an electromagnetic device [Fig. 1; actuators 121-126], wherein the electromagnetic device includes a first attracting member [Fig. 1; 123], a second attracting member [Fig. 1; 124],

and a target member [Fig. 1; the objected mounted on the fine stage; col. 3 lines 7-9] situated between the first attracting member and the second attracting member, wherein the target member is connected to the fine stage [Fig. 1; the object (col. 3 lines 7-9) is mounted onto the fine stage 12o and therefore connected to the fine stage 120] and the first and second attracting members are connected to the coarse stage [Fig. 1; actuators 123 and 124 are connected to the coarse stage 110], the method comprising: accelerating the fine stage [Fig. 1; 120] by a first attracting force [col. 1 lines 50-55; the target on fine stage 120 will necessarily go through a period of acceleration as the controller signals it to go from a fully stopped position to moving position] generated in a first gap [Fig. 2; X1] between the target member [Fig. 1; wafer on 120] and the first attracting member [Fig. 2; 121; or 123] with a first distance; changing a position of the target member [Fig. 1; 120] with respect to the first and the second attracting members when the fine stage is moving at a constant velocity [col. 3 lines 54-58]; and decelerating the fine stage [the target on fine stage 120 will necessarily go through a period of acceleration as the controller signals it to go from a fully stopped position to moving position] by a second attracting force generated in a second gap [Fig. 2; X2] between the target member [Fig. 2; 120] and the second attracting member [Fig. 2; 122 or Fig. 1; 124] with a second distance.

With respect to claim 41, Yuan discloses that the electromagnetic device [Fig. 1; 121-126] does not generate the attracting force during changing the position of the target member [Fig. 1; object on fine stage 120].

With respect to claim 42, Yuan discloses that the position of the target member [Fig. 1; 120] is changed from a first position where the first gap has the first distance to a

second position where the second gap has the second distance when the fine stage is moving at a constant velocity [col. 3 lines 54-58].

With respect to claim 43, Yuan discloses that the first position is where the target member [Fig. 1; 120] is positioned nearer to the first attracting member [Fig. 1; one of the actuators 123; this occurs when target 120 moves to the left towards attracting member 123 whilst stage 110 simultaneously moves to the right on base 112, as a result of target 120 being mounted on stage 110, both of which are mounted on base 112] than the second attracting member [Fig. 1; 124], and the second position is where the target member [Fig. 1; 120] is positioned nearer to the second attracting member [Fig. 1; 124; this occurs when target 120 moves to the right towards attracting member 124 whilst stage 110 simultaneously moves to the left on base 112, as a result of target 120 being mounted on stage 110, both of which are mounted on base 112] than the first attracting member [Fig. 1; 123].

Response to Arguments

Applicant's arguments filed 11/13/2007 have been fully considered but they are not persuasive.

Applicant comments on page 15 of the REMARKS regarding amended independent claim 9 that claim 9 is not anticipated by Yuan, because Yuan does not disclose manipulating the relative position of the target member by moving the attracting framework relative to a base member to decrease the distance between one of the attracting members and the target member during a coarse stage adjustment phase; and that Yuan

indicates "coarse stage control system 310 moves coarse stage 110 as necessary to maintain an appropriate gap distance, i.e. less than 400 um."

Examiner points out that as pointed out by the applicant, col. 8 lines 40-42 states that the coarse stage adjustment control system 310 maintains an appropriate gap distance of 400 um between attracting member 123 and target member 120 (alternatively the wafer placed on 120). The target member 120 is mounted on coarse stage 110 and base member 112. This means that in the event the fine stage adjustment creates a gap that is larger than 400 um, then *the coarse stage will act to decrease that distance back to the appropriate gap distance of 400 um.* This satisfies applicant's "decrease the distance" limitation of claim 9.

Applicant comments on page 16 of the REMARKS regarding amended independent claim 12 that Yuan fails to disclose an actuator, which changes a gap size between the target member and an attracting member during a constant velocity phase.

Examiner points out that as pointed out above; the gap size is changed in that it undergoes correction to maintain 400 um. During the change of gap size to accomplish correction back to 400 um, the velocity of the stage will necessarily undergo a time period, however small, of constant velocity. Col. 3 lines 54-58 explicitly state that the stage undergoes a period of constant velocity. The actuator is coarse stage control system 310 combined with attracting members 123 and 124.

Applicant comments on page 16 of the REMARKS regarding amended independent claim 13 that Yuan fails to disclose a controller, which is adapted to change gap size

between the target member and one or more attracting member during a constant velocity phase followed by the acceleration and/or deceleration phase.

As pointed out above, the gap size is changed and there must be a period of constant velocity. Yuan explicitly states at col. 1 lines 50-55 that the stage undergoes acceleration, and at col. 3 lines 54-58 that the stage undergoes a period of constant velocity.

With respect to the comments regarding newly added claims 24-43, please see above rejection for these claims.

Based on examiner's best understanding, it is believed that the prior art reference by Yuan reads on the amended claim language of all the independent claims. Accordingly,

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dharti H. Patel whose telephone number is 571-272-8659. The examiner can normally be reached on 7:00 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Sherry can be reached on 571-272-2800, Ext. 36. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Dharti H. Patel/
GAU 2836
01/21/2008